

Saturday



Magazine.

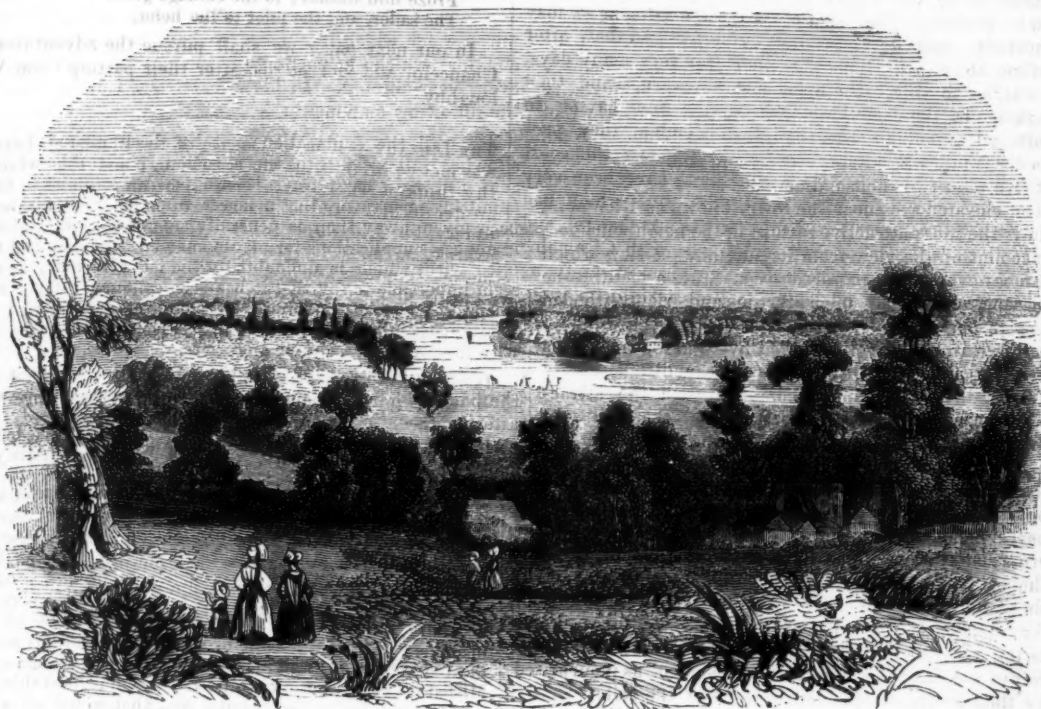
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THE BANKS OF THE THAMES. X.



THE THAMES, FROM RICHMOND HILL.

Say, shall we wind
Along the streams? or walk the silent mead?
Or court the forest glades? or wander wild
Among the waving harvests? or ascend,
While radiant summer opens all its pride,
Thy hill, delightful Sheen? Here let us sweep
The boundless landscape: Now the raptured eye,
Exulting swift, to huge Augusta* send,
Now to the sister hills† that skirt her plain,
To lofty Harrow now, and now to where
Majestic Windsor lifts his princely brow.
In lovely contrast to this glorious view,
Calmly magnificent, then will we turn
To where the silver Thames first rural grows.
There let the feasted eye unwearied stray;
Luxurious, there, rove through the pendent woods,
That nodding hang o'er Harrington's retreat;
And stooping thence to Ham's embow'ring walks,
Slow let us trace the matchless vale of Thames;
Fair winding up to where the Muses haunt
In Twickenham bowers, and for their Pope implore
The healing god; to royal Hampton's pile;
To Claremont's terraced height, and Escher's groves,
Where in the sweetest solitude, embraced
By the soft windings of the silent Mole,
From courts and senates Pelham finds repose.
Enchanting vale! beyond whatever the Muse
Has of Achaia or Hesperia sung!
O vale of bliss! O softly-swelling hills!
On which the power of cultivation lies,
And joys to see the wonders of his toil.—
Heavens, what a goodly prospect spreads around,
Of hills and dales, and woods, and lawns, and spires,
And glittering towns and gilded streams, till all
The stretching landscape into smoke decays.

In these beautiful lines—whose length will be pardoned on account of their beauty—does the poet Thomson speak of the far-famed view from Richmond Hill.

* Poetical writers often allude to London under the designation of *Augusta*, one of the names by which it was known in the times of the Romans. † Highgate and Hampstead.

VOL. XIX.

The town of Richmond is but a mile or two distant from Twickenham, where we left the reader in our last article; yet the whole distance is so studded with attractive and picturesque objects, as to seem much more extensive than it is. Bolingbroke, Peterborough, Pope, Thomson, Reynolds, Horace Walpole, Garrick, Colman, and many other distinguished men, have given a never-dying celebrity to the very small district included within two or three miles of Twickenham, and of which Richmond forms a part; a celebrity arising either from their poetical and pictorial allusions to the scenery, or from their having dwelt on the banks of the Thames at this part.

The town of Richmond, containing about six thousand inhabitants, has been a good deal connected with the reigning families of England. The manor became the property of the Crown in the time of Edward the First, who, as well as his next two successors, resided here. The last-mentioned monarch built a palace here; and since his time, the manor has been the residence of many members of the royal family. Queen Ann, wife of Richard the Second, died here; an event which so affected the king, that he abandoned the palace and allowed it to become ruinous, but it was restored with great splendour by Henry the Fifth. Having been destroyed by fire in 1498, the palace was rebuilt by Henry the Seventh, who changed the name from *Sheen*, which it had hitherto borne, to *Richmond*, from the place of that name in Yorkshire, the earldom of which was one of Henry's titles. Philip the First of Spain, and Charles the Fifth of Germany, were at different times entertained as guests at Richmond Palace. Queen Elizabeth, and afterwards Charles the First, frequently resided here. During the

troubles of the civil war, the palace was taken out of royal hands; but at the Restoration, it was delivered to the queen mother, though in a very dilapidated state; it was shortly afterwards pulled down, and private houses erected on the site, the owners of which hold a lease from the Crown. The building in which some branches of the royal family have since resided is the *Lodge*, and not the palace properly so called.

There are two parks belonging to Richmond, the Old or Little, and the New or Great Park. The Old Park extends along the banks of the Thames nearly from Kew to Richmond, and comprises the extensive gardens, dairy-farm, and grazing-farm, so much esteemed by George the Third. The New, or Great Park, enclosed by Charles the First (the older park having belonged to the palace of the early kings) is situated southward of Richmond, extending from the hill to the Kingston road. It is eight miles in circumference, and comprises an area of more than two thousand acres.

The elevated spot near the town, known as Richmond Hill, is the most attractive feature in the neighbourhood, on account of the view from its summit,—a view which embraces everything required to constitute a picturesque landscape, consisting of a fertile and richly-wooded plain, through which the Thames flows in a winding course, with its banks ornamented by numerous mansions and villas, and bounded by hills in the distance. Its proximity to the metropolis, combined with the attraction of scenery which it possesses, and the facility of conveyance both by land and water, cause it to be much resorted to.

Somewhat to the north-east of Richmond is the pretty little village of Kew, situated on the southern bank of the river, opposite Brentford. There is a royal palace and garden at Kew, which have been long celebrated for their beauty,—at least the garden. The palace is nominally occupied by the King of Hanover, as Duke of Cumberland. It was a private mansion until the time of King George the First, but it then came into the hands of the Crown. George the Second, when Prince of Wales, frequently resided there, and Thomson, the poet, who at that time inhabited a house at Richmond, was a frequent visitor at his table. The Princess Dowager of Wales, mother to King George the Third, ordered Sir William Chambers to lay out the grounds and form a conservatory and botanic garden. George the Third, who resided for a considerable time in a mansion since called the Nursery, in which most of the royal family were brought up, and in which his consort, Queen Charlotte, died, greatly improved and extended the gardens, which he united to those of Richmond, and began to erect a royal palace in the ancient style of English architecture, which, after remaining for several years in an unfinished state, was taken down in 1828. The royal gardens are tastefully laid out, and embellished with temples of the various orders of Grecian architecture, a Turkish mosque, and a Chinese pagoda of considerable elevation, from the summit of which a most extensive prospect is obtained of the scenery on the banks of the Thames, and of the surrounding country.

The botanic garden at Kew is in some respects distinct from the garden or pleasure-grounds attached to the palace. Its avowed purpose was to spread the knowledge of botany through the country, by collecting specimens of rare plants from all parts of the world, and supplying duplicate specimens to other gardens. It occupies about fifteen acres, of which a part is set off as an arboretum, for the reception of trees, and the remainder is occupied by stoves and greenhouses, borders of herbaceous plants, spaces left for the arrangement of greenhouse plants in the open air in summer, offices, yards, &c. The arboretum contains many very fine specimens of hardy exotic trees and shrubs, most of which are marked with labels, numbered, and referring to a private catalogue in the garden. Among the stoves and green-

houses is one filled with magnificent specimens of New Holland plants, a second with small plants from the Cape of Good Hope and New Holland, a third with succulent plants, and several others with stove plants of different kinds. From the peculiar manner in which the botanic garden is, on the one hand, connected with the palace at Kew, and, on the other, dependant on the nation for support, it is not easy to say whether it is a public or a private establishment. About three or four years ago a Committee appointed by the Lords of the Treasury commissioned Dr. Lindley to inspect the garden, with a view of reporting how far it answered the purpose for which it appears to have been established, and for which a portion of the national revenue is every year allotted. In his Report, Dr. Lindley makes the following statement:—

After all the explanation that has been offered; after allowing full weight to the assertion that the botanical garden at Kew has always been a private establishment; admitting, moreover, that a larger number of plants has been given away than is generally supposed, and that in many cases applications for plants have been liberally complied with, which is undoubtedly the fact; it really does seem impossible to say that it has been conducted with that liberality or anxiety to promote the ends of science, and to render it useful to the country, which it is usual to meet with in similar institutions elsewhere.

We may here remark that the public are admitted to the botanic garden daily, during certain hours in the afternoon.

The church of Kew is situated on a pleasant grassy spot called the "Green," between the bridge and the entrance to the botanical garden. It was erected in the reign of Queen Anne; and in the church-yard attached to it lie the remains of two celebrated English painters of the last century, Gainsborough and Zoffany, the former of whom died in 1788, and the latter in 1810. The scenery of Kew was celebrated by Thomson in the following lines:—

Fast by that shore where Thames' translucent stream
Reflects new glories in his breast;
Where splendid as the youthful poet's dream
He forms a scene beyond Elysium blest;
Where sculptured elegance and native grace
Unite to stamp the beauties of the place;
While sweetly blending, still are seen
The wavy lawn, the sloping green,
While novelty with cautious cunning
Through every maze of fancy running
From China borrows aid to deck the scene.

Let us now cross to the Middlesex side of the water. Immediately opposite a point of the river midway between Richmond and Kew, is the pleasant village of Isleworth. It consists of one principal street, filled with respectable and well-built houses. The environs are profusely rich in beautiful scenery, both banks of the river being adorned with elegant mansions and villas, with their annexed pleasure-grounds and shrubberies. A large portion of the land in the neighbourhood is cultivated by market-gardeners, who supply the London market; raspberries and strawberries are produced here in great beauty. It was at Isleworth that the insurgent barons held their head-quarters for a considerable time, in the reign of Henry the Third, under Simon de Montfort, earl of Leicester. There was a palace at Isleworth belonging to the Earl of Cornwall, the king's brother; and during a contest between the king and the nobles, this palace was razed to the ground by a riotous mob, which proceeded from London for that purpose.

But by far the most interesting object near Isleworth is Sion House, the seat of the Duke of Northumberland. The history of this house, and the manor belonging to it, carries us back to the year 1414, when a splendid monastery was founded at Twickenham, for sixty sisters, thirteen priests, four deacons, and eight lay-brethren of the order of Saint Augustine. About

twenty years afterwards, the community removed to Isleworth, where a spacious edifice called the monastery of Sion was erected for their reception. At the dissolution of monasteries under Henry the Eighth, the site was granted to Sir Edward Seymour, afterwards Duke of Somerset, and Lord Protector, who built thereon the superb mansion since known as Sion House. After his fall it came into the hands of the Percys, earls of Northumberland.

The mansion, which underwent several alterations and additions in the seventeenth century, under Inigo Jones, is a spacious quadrangular and embattled structure, with towers at the angles. The entrance from the Western Road is through a handsome gateway, on each side of which is an open colonnade leading into a spacious lawn, ornamented with clusters of stately trees, and shelving to the margin of the Thames, which pursues its winding course along the border of the park and grounds. A noble flight of steps leads to the great hall, which is decorated with colossal statues, and a fine bronzed cast of the Dying Gladiator. The hall opens into a handsome vestibule, the floor of which is of scagliola marble, and the walls richly ornamented in relief, and embellished with gilt trophies. Twelve columns of verd antique, supporting gilt statues, and sixteen pilasters of the same rare and costly material, impart an air of sumptuous magnificence to this part of the building. The gallery, which contains the library and museum, is one hundred and thirty-three feet in length, and is finished after the antique style, in stucco, of the most light and elegant design. The ceiling of this gallery is embellished with paintings, and ornamented with various devices, harmonizing with the general character of the whole; and immediately below it are paintings in medallions, exhibiting a series of portraits of the Earls of Northumberland, of the Percy and Seymour families. To describe the apartments of such a building would be a useless task; for it may well be supposed that a residence of one of the highest and most ancient of our nobility exhibits all that wealth and taste can accumulate in the way of decoration.

A little northward of Sion House is "dirty Brentford," a town which more than one poet has signalized in a rather uncomplimentary manner; for Gay speaks of

Brentford, tedious town,
For dirty streets, and white-legged chickens known.
And Thomson has spoken of

Brentford town, or town of mud.

The town consists principally of one long street, upwards of a mile in length, which contains a few manufactories; but the chief source of employment to the inhabitants used formerly to be derived from the immense traffic along the Great Western Road, which passes through the town. But since the opening of the Great Western Railway, a considerable portion of this traffic has been removed from the high road, and Brentford has suffered in consequence. Brentford is considered the county town of Middlesex: as the elections for the county used to be held there, as are now the nominations of candidates. A neat stone bridge, erected in the year 1825, connects Brentford with Kew.

Though religion in its ordinary mode of exhibition commands but little respect, when it rises to the sublime, and is perceived to tincture and pervade the whole character, it seldom fails to draw forth the homage of mankind. The most hardened impiety and daring profligacy will find it difficult to despise the man who manifestly appears to walk with God, whose whole system of life is evidently influenced and directed by the power of the world to come. The ridicule cast on religious characters, is not always directed towards their religion, but more often perhaps to the little it performs, contrasted with the loftiness of its pretensions; a ridicule which derives its force from the very sublimity of the principles which the profession of piety assumes.—
ROBERT HALL.

THE DEAD SWALLOW.

A BIRD—but 'tis a foolish thought—
To me doth seem as though it were
A little spirit of the air,
Too happy to be killed or caught;
And I could weep to see a thing,
So joyous in its volant mirth,
Dashed rudely down from sky to earth
With bleeding breast and broken wing.
Thou did'st not deem, an hour ago,
Poor bird! when in yon azure height
Thy taper wings were twinkling bright,
Of lying here so cold and low!—
When morn hung glimmering o'er the plain,
Thy breast was wet with twilight dew—
But now, the life-blood oozing through
Hath dyed it with a darker stain;
And now, to skim the sunny lea,
And oft with sportive splash to break
The mirror of the broad blue lake—
Poor bird! is never more for thee!
Soon—when our northern summer dies—
Thy gathering clans will gaily flee,
To softer climes beyond the sea,
Through paths untracked by human eyes;
But thou! thy pilgrim toils are o'er—
So here I'll pile thy sylvan bier
With leaves which winds have scattered ere,
Poor bird! like thee to rise no more!—J. S. B.

I WILL mention three facts, illustrative of the vastly superior extent to which, in commercial countries, credit is necessarily employed as an instrument of exchange beyond real or metallic money. These are, first, that the entire commerce of Scotland, both foreign and domestic, is carried on without the practical use of a single gold piece. Secondly, that at the Bankers' Clearing-house in London, exchange transactions are daily settled to the extent of five millions sterling—on some days of thirteen millions—without the intervention of any coin whatever, and by the employment of a floating balance of only about £200,000 in Bank of England notes, themselves merely representing the credit of that establishment. Thirdly, that there is at every moment in existence in England an aggregate mass of transferable credit in the shape of book-debts, foreign and inland bills of exchange, mortgages, annuities, and other moneyed liabilities, including the great national debt itself, to an extent, as regards the whole empire, certainly of several thousand millions in value, the whole of which is strictly in employment as a medium of exchange; an instrument, that is, whereby one individual obtains possession, by consent, of the produce or property of another; while the amount of real or metallic currency circulating through the same countries does not, perhaps, exceed thirty millions, and might probably, as in Scotland, be dispensed with altogether, without in the least affecting the extent of this prodigious mass of transactions on credit.—SCROPE'S *Political Economy*.

WHEN Europeans reached China three hundred years ago, they found all arts arrived at a degree of perfection which was quite astonishing, but which the Chinese have not since surpassed. Later still, they discovered vestiges of high state of knowledge, which had disappeared. The nation was industrious and mechanical; the greater number of scientific methods were traditionally preserved; but science itself no longer existed. This explains the kind of singular immobility in which was found the mind of the Chinese. In following the steps of their fathers, they had forgotten the reasons after which their fathers worked and acted. They made use of the form without the sense. They kept the instrument, but had no longer the power of modifying or improving it. Accordingly nothing was left to them but eternal imitation, all being dark and unknown to them beyond the beaten path. The source of knowledge was dried up, although the streams continued somehow or another to flow. In this manner China continued to subsist for ages, peaceable, industrious, rich, and happy. War and revolution were unknown to them. Might not some similitude be found between us and those barbarians? Some people allow light to be ravished from them, whilst others tread it out beneath their feet.—DE TOCQUEVILLE.

ON CHESS. XXII.

THE KNIGHT'S MOVE.

WHILE studying the various powers of the pieces at chess, we cannot fail to be struck with the remarkable move of the knight: we have made it probable that the move of this piece originated in a compound of the shortest moves of the bishop and rook; but in modern chess this piece is the only one which is allowed to move over the heads of other pieces. The peculiar power which this privilege gives to the knight in actual play, it is not our purpose here to discuss: another interesting question will occupy our attention. A little consideration will show that the king, provided no other piece were on the board, could pass in succession to every one of the sixty-four squares, either with or without going twice over the same square; the queen could do the same, and so likewise could the rook. But the pawn, as it can only move straight forwards (except in capturing, and even then it moves obliquely forwards), cannot traverse the sixty-four squares; nor can the bishop do so, for one consequence of his diagonal move is to confine him to squares of one colour: consequently, he can traverse only thirty-two squares. The knight is yet remaining, and a question arises,—Can the knight traverse the sixty-four squares without stepping on any square twice? The solution of this question is one of the most remarkable circumstances in the history of chess; for as it was soon found that the problem could not be solved by mere inspection, the difficulty attending it drew the attention of ingenious persons towards the subject. Difficulties act upon scientific and ingenious minds rather as incentives than as discouragements; and this problem of the knight's move attracted the notice of first-rate mathematicians, who might not otherwise, perhaps, have paid any attention to chess and its associations. Among the distinguished men who have endeavoured to solve this problem are Euler, Bernouilli, Mairan, Demoivre, Montmort, Willis, and Dr. Roget; and we propose in the present chapter shortly to consider the results at which they arrived.

Most of the solutions of the problem (for we may here state at once that it *can* be solved,) have been arrived at by repeated trials, without proceeding in accordance with any particular law; and, we doubt not, that most of our readers could, with a little patience and ingenuity, carry the knight over the sixty-four squares, after many trials. But the object of such a man as Euler, whose profound mathematical talents led him to seek for principles in every department of study, was to elicit some general law by which the required object might be attained. He was successful in tracing the outline of a rule or law by which this might be accomplished; but the practical application of it was so difficult, that we doubt whether any one but himself has ever adopted it. The thorough mastery of the subject can only be attained when we are able to solve the problem in all its varieties, that is, to begin the circuit of the knight at any given square, and to end at any other given square.

In order to trace the power of the knight step by step, an anonymous writer, about twenty years ago, gave representations of imaginary chess-boards, rectangular, but containing a smaller number of squares than a real board; and he was able to demonstrate, that if the board contained 12, 20, 21, 24, 25, 28, 30, 32, 35, 36, 40, 42, 48, 49, or 56 squares, the knight could be carried over the whole of them, without going twice on the same square. These moves of the knight may be represented either by numerals, or by lines drawn on a diagram: the latter is the more perspicuous and pleasing of the two; and we will here give representations of the modes of proceeding in a few of these cases. Let us suppose there are three boards, containing respectively 5×5 ,

6×6 , and 7×7 squares, the knight can be carried over them in the following manner:—

The angles represent the various positions of the knight; and the lines, his paths from one square to another. Beginning with fig. 1 (a), we see that if the tour commences at the left hand bottom corner, all the twenty-five squares in succession can be traversed without any one being covered twice; and the route terminates at the central square. In fig. 1 (b), the tour commences at the right-hand bottom corner square, and, after extending over the thirty-six squares in succession, ends at the square next above the initial square. In fig. 1 (c), the route is over all the forty-nine squares, and the terminal square is at a considerable distance from the initial one.

Fig. 1 (a).

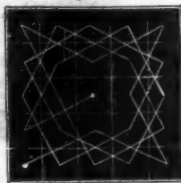


Fig. 1 (b)

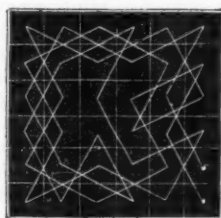
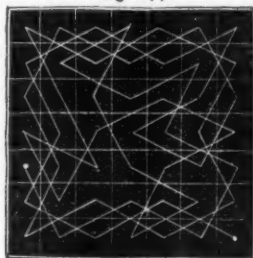


Fig. 1 (c).



These examples show that the knight may make the tour of a chess-board containing a smaller number of squares than the regular board; and there is little doubt that it might also be done on a board of more than sixty-four squares*. These imaginary boards have helped to devise systems whereby the problem can be solved on a real board.

We will now give three diagrams, representing three modes of solving the problem on a regular chess-board; and the reader would gain a clear idea of the subject by performing the same operation with a knight: he will do well to mark each square with a counter, as the knight steps on it, in order not to go twice on the same square. In the first diagram we shall commence at one corner and terminate at another: in the second, we shall cover all the thirty-two squares of one half of the board, before proceeding to the other half: in the third we shall give a *re-entering* route, that is, one in which the *last* square is situated at exactly a knight's move from the *first* square, so that the tour may be re-entered on, and performed in precisely the same way any number of times.

In fig. 2 (a), the regular board of sixty-four squares is traversed by the knight, beginning at one corner, and ending at another; this, it will be seen, forms a figure having some degree of symmetry, but less so than one or two which we shall hereafter give. In fig. 2 (b), the squares are separated into two portions, one of which is traversed before the knight crosses over to the other. Fig. 2 (c.) possesses this distinguishing property, that we can commence the tour on *any* square: in drawing the diagram, we commenced at the right-hand bottom corner, and ended at the knight's third square; but any other initial square might have been selected, because the route is an interminable one, re-entering into itself.

Many other ingenious modes have been devised, some of which we shall notice hereafter; but no satisfactory attempt to give a *general* solution to the problem had been made public, until the month of April, 1840, when Dr. Roget communicated a short but admirable paper to the *Philosophical Magazine*, unfolding a method by which the problem could be solved in any

* Ciccolini has solved the problem of the knight's move over a board of one hundred squares, as well as over a circular board of sixty-four squares.

Fig. 2 (a).

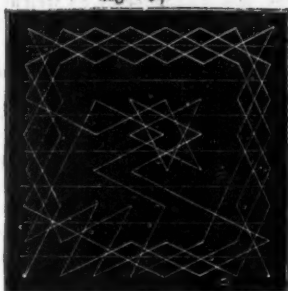


Fig. 2 (b).

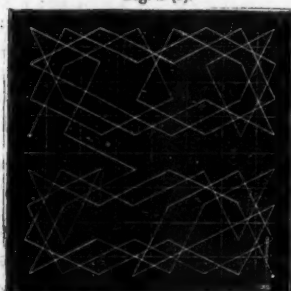


Fig. 2 (c).



form, that is, by beginning at any given square, and terminating at any other given square of the opposite colour*. We will now attempt to explain this ingenious method.

In the first place, the reader must conceive the board to be divided into four quarters, of sixteen squares each, by two lines passing through the middle at right angles to each other, and parallel to the edges of the board. Then selecting any quarter, we shall find that the sixteen squares may be divided into four systems, each of which consists of four regular knight's moves. These systems are shaped, two as perfect squares, and two similar to the rhombus, lozenge, or diamond (in future we shall use the last of the three names). Thus in fig. 3 the sixteen squares, constituting one quarter, are divided into four systems, represented by these four kinds of lines,

forming two squares and two diamonds; and it will be seen that the four sides forming each of these figures, are regular knight's moves.

Fig. 3.



Fig. 4 (a).

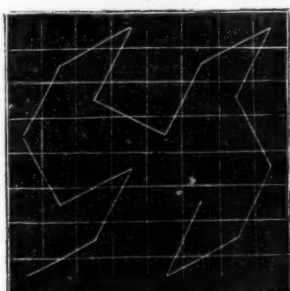
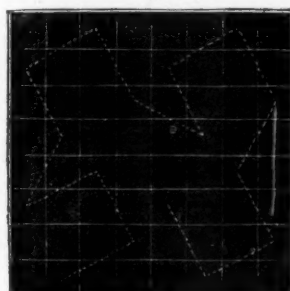


Fig. 4 (b).



Now the question which arises, is this:—Can the knight after having traversed the sixteen squares of one system, pass on to another system? He can do so under certain conditions: he can pass from a square to a diamond system, or from a diamond to a square system; but not from a diamond to a diamond, or from a square to a square. Moreover, the sixteenth, or last square of each system ought to be as near the *centre* of the board as possible, since, if it be at or near a corner, the passage to another system may be difficult, or even impossible. If we examine fig. 4 (a), we shall see that, beginning at the corner square, the terminal one of that system is such as to allow the knight to step on to either of the square systems, there being a choice of four moves, of which two belong to each of the square systems: similarly, from the terminal square in fig. 4 (b), we can select four squares to move to, of which two belong to each of the diamond systems.

If the necessary precautions be attended to, it will now be evident that the problem may be solved by the method under consideration. Let the initial square, for example,

In the next place, it will be found, that, after passing over the four squares of one system in one quarter of the board, we can pass to the same system in an adjoining quarter; and, after traversing that system, can pass on to another quarter, and so on; thus, in sixteen moves, we can traverse the sixteen squares forming one system of the whole board. We will demonstrate this as to *two* of the systems, and the reader will then readily admit its truth as to the other two. In fig. 4 (a), we traverse all the sixteen squares of the system ———; and in fig. 4 (b), all those of the system The diamonds in the former case, and the squares in the latter, *appear* to be incomplete, because only three out of the four sides are represented; but this necessarily results from the conditions of the problem, for we must not go twice on the same square, which we inevitably should do if we drew the four sides of each figure: the knight, however, steps on the squares representing the *angles* of each figure, and this is sufficient to make our description correct.

be in one corner: it will then belong to a diamond system. After traversing the sixteen squares of that system, the knight passes to a square system, which is succeeded by the other diamond, and this by the other square, when the tour terminates. A little practice will give the necessary facility, provided the player attends to these two points:—1st, to complete the sixteen squares of one system before he passes to another: 2nd, to terminate each system rather towards the centre of the board than towards one corner. Generally speaking, he may pass round either to the right or to the left *ad libitum*, and may choose any one of the sixty-four squares he pleases, as the initial square.

In our next article we will apply this method to several remarkable forms of the problem under consideration.

* Since the knight at each move, goes to a square of a different colour from that which he before occupied, all the *odd* squares are of the same colour as the initial square, and all the *even* squares must be of the opposite colour; consequently the sixty-fourth square, which is the terminal one, must always be of the opposite colour to the initial one.

WE say of a false man, Trust him not, he will deceive you; we say concerning a weak and broken staff, Lean not on it, for it will deceive you. The man deceives because he is false, the staff because it is weak, yet our own heart is both. The heart of man hath not strength to think one good thought of itself; it cannot command its own attention to a prayer ten lines long, and no wonder then that in secret it should grow weary of a holy religion, which consists of so many parts as to make the business of a whole life.—
JEREMY TAYLOR.

THE CASTING OF STATUES IN BRONZE.

THE preparation of statues from brass, bronze, or other metal, is a process requiring an intimate union of that refined and elevated taste which distinguishes the sculptor, with the knowledge of the metals and their qualities so indispensable to the founder. We will endeavour to give a popular description of these operations.

In the first place, it must be observed that all bronze statues are hollow, consisting of a mere shell, delicately worked on the exterior, and more rudely fashioned in the interior. To produce this shell a complicated series of operations are necessary, comprising alternate modellings and castings. The nucleus with which the artist commences his work is an inner mould or core, composed of potter's clay, plaster, and brick-dust, mixed with water to a working consistence; this clay is worked upon a slight iron frame or skeleton, and fashioned into a rude resemblance of the figure about to be cast, but smaller in all its dimensions. The rough core, thus formed, is covered with wax of such thickness, that the dimensions of the figure may be in excess of that intended to be executed: and the sculptor proceeds to sculpture this waxen surface with all the delicacy and care which he would bestow upon a marble statue; working out his entire design on the wax. This part of the process being completed, little tubes of wax are fixed perpendicularly to the surface, all over the figure, for a purpose which will be presently explained; and the whole of the wax is then coated or covered with a layer termed the shell. This shell consists of strata, formed of different materials; the first is a composition of clay and old white crucibles well ground and sifted, and mixed with water to a creamy consistence; this is laid on with a pencil, in the manner of paint, seven or eight successive coats being given, and the surface dried after each. The next stratum consists of the same substance together with a little earth to give it more solidity, and the third stratum is still more solid. The soft or semi-fluid shell, thus laid on, takes the impression of the different parts, which it afterwards imparts to the metal. The shell is now secured by several bandages of iron wound round it, secured to an iron ring at the top, and to a grating at bottom, on which the model had been erected.

Thus far all the operations may be classed under the head of modelling; but the next process is a very curious one, viz., to melt out the wax from between the clay core and the earthen shell, and thus leave a vacancy afterwards to be filled up with metal. The grating on which the model has been built up is placed at the bottom of a square hole made in the ground. This hole is lined with free-stone or brick; and beneath the grating is a smaller hole provided with a furnace. When the figure is complete, a moderate fire is kindled in the small furnace just alluded to; and the heat, being confined and equalized by boards placed over the hole, speedily melts the layer of wax between the core and the shell, and causes it to run down from all parts of the figure, out of pipes introduced for that purpose at the foot of the mould. There must now be a vacancy everywhere where the wax had been, and this vacancy is carefully preserved.

The hole in which the figure is placed is then entirely filled up with bricks; and the fire in the furnace is continued until the whole contents of the furnace, mould as well as bricks, are thoroughly red-hot. The furnace is then extinguished; and when the contents are cold, the bricks are removed, and the space is filled up by earth rammed in closely round the figure.

All is now ready for the introduction of the melted metal, and we will therefore proceed to speak on that point. Sometimes brass is the metal of which statues are formed; but, generally speaking, the metal is an alloy of copper and tin. In every case copper is one of the component metals, for brass is a compound of copper

and zinc; while bronze, or statuary metal, as well as bell-metal and gun-metal, are compounds of copper and tin. The chief difference between the last-named three compound metals is in the proportion between the copper and the tin. Generally speaking, bronze contains a larger proportion of copper than of tin; but most statuary have particular combinations which they prefer. The furnace in which the bronze is melted somewhat resembles an oven, and is provided with three apertures, one to put in the wood, another for a vent, and a third to run the metal out at. From this last-mentioned aperture, which is kept closed while the metal is in fusion, a little tube or canal extends, by which the melted metal is conveyed to a large earthen basin situated over the mould, and from this basin spring a number of little jets, for conveying the metal to different parts of the figure. All the jets are terminated or stopped with plugs, which are kept close until sufficient metal is contained in the basin to supply the whole figure; they are then speedily removed by iron rods attached to them, and the melted metal rushes into, and fills up all the cavities which had been previously occupied by the wax.

When all is cold, the earth which had been pressed into the pit is removed, the shell or crust is broken off from the metal, and the clay core is removed from within it; leaving a thin metallic figure, whose external surface represents the object intended, but needs to pass through the hands of the sculptor, who repairs any defects.

Where the statue is very large, the quantity of metal necessary for this process is considerable, and constitutes a formidable item in the expense. Hence various plans have been suggested for producing very thin statues, in order to effect a saving in the quantity of metal employed. One such method, employed to a considerable extent on the Continent, is the following. The figure is first made in plaster of Paris, of the exact shape and dimensions it is intended to be when completed in metal, and placed in an erect position on a firm platform. It is then covered all over by a shell, composed of a number of pieces fitted very correctly together, so that they may be removed and built up in another situation, forming in the interior a figure exactly resembling the original one in plaster. The work is commenced at the bottom, by covering with strong sand such part as is intended to form the block of the shell to about an inch or an inch and a half in thickness, to which is added about one foot in thickness of plaster of Paris, which unites with the sand, and forms one block: the remaining part of the figure is completed up to this height all round, in a similar manner, by blocks, of which the number and arrangement must be such, that they may be removed when the shell is complete, without disturbing the sand. Another course is now commenced and completed in the same way, and the work is thus continued until the whole figure is completely surrounded by the shell. During the progress of the work, tubes are cast in with the plaster, for the admission of the metal, and for the escape of the air, as in the common method; and iron rings are let into the plaster for the convenience of raising and removing the blocks. When the shell is complete, it is taken to pieces and removed to the casting-pit, where it is carefully rebuilt, and the interior filled up with the material to form the core. It is now a second time taken to pieces, leaving the core of the exact shape and dimensions of the original figure, from which is scraped off such a quantity of material as will give the necessary thickness of metal to each part of the figure. The shell is then again put together in its original position, and will, therefore, leave a space between the interior of it and the core, exactly equal to the thickness of material which has been removed. Nothing now remains to be done, but drying the mould, and pouring on the metal, which operations are performed in the ordinary way.—This method effects a great saving of metal; but it at the same time requires much care and dexterity.

RURAL SPORTS FOR THE MONTHS NOVEMBER.

MYSTERIOUS POWER! which guides by night
Through the dark wood the illumined sight;
Which prompts them by the unerring smell,
The appointed prey's abode to tell,
Bore with long bill the investing mould,
And feel, and from the secret hold
Dislodge the reptile spoil! But who
Can look Creation's volume through,
And not fresh proofs, at every turn,
Of the CREATOR'S mind discern:
The end to which his actions tend;
The means adapted to the end;
The reasoning thought; the effective skill;
And, ruling all, the Almighty will?

BISHOP MANT'S *British Months*.

NOVEMBER introduces the commencement of a sport that must be practised in bleak and marshy districts by those who are its advocates. The shooting of woodcocks and snipes demands on the part of the sportsman a power of resisting the effects of the wet and cold season, and of bearing the inconveniences resulting from the nature of the ground. Of snipe-shooting, in particular, it has been said, that the man who follows it should be possessed of a strong constitution, not liable to catch cold, and should have all the fortitude as well as exertion of a water spaniel. To succeed in his sport, he must be habitually inured to wet, dirt, and difficulty, and not be daunted by the most inclement weather. It appears strange, to those who have but little sympathy with the pursuits of sportsmen, that, at a season of the year, when even the most favoured spots of our island present few attractions to out-door employments, and when, except for the transaction of necessary duties, we might naturally be willing to shelter ourselves in our comfortable homes from the cheerless and foggy atmosphere without,—that, at this uninviting season, the members of the sporting community should find their chief delight in seeking out just the most dreary, and wet, and chilling localities in our own and the sister island, and there, in defiance of bog, marsh, or half-frozen pool, should follow, with so much enthusiasm, the task of destroying our winter visitants.

Woodcocks are fond of wild, marshy copses, where, near the pools, which are frequent in such spots, they can bore the ground with ease, and find abundance of food. Solitude, shelter, and humidity, are essentials with these birds; and, therefore, they shift their quarters as cultivation changes the character of a country. Devonshire, Dorsetshire, Cornwall, and Sussex, are the favourite English localities for these birds; and both North and South Wales are celebrated for the sport they afford.

The Woodcock (*Scolopax rusticola*) is placed at the head of the Snipes proper, and, according to Bewick, is fourteen inches in length, twenty-six in breadth, and weighs about twelve ounces. The shape of the head is remarkable, being in profile, rather triangular than round, and extending over the base of the bill in all directions, so that, in whatever way the bill may work in the ground, the weight of the head gives force to its movements, as it penetrates the oozy soil in search of food. The bill itself is, however, the distinguishing mark of this family of birds. The upper part, or mandible, is three inches long, and projects beyond the lower one, ending in a kind of knob, which is susceptible of the finest feeling. By means of this curious organ, the woodcock, in common with other birds of the same genus, is enabled to distinguish the small worms, &c., abounding in soft moist grounds, and then to extract them with its sharp-pointed tongue. With the bill also it explores among fallen leaves, and other rubbish, in search of insects which shelter underneath. Three varieties of woodcocks, common in Britain, are noticed by Dr. Latham. The head of the first variety is of a pale red, the body white, and the wings brown;

the second is of a dun, or rather cream colour; and the third of a pure white. There are many other variations in the plumage of these birds.

The grand resort of woodcocks during summer, is understood to be the marshy woods to the north of the Baltic, though this species is generally extended throughout all the climates, both hot and cold, of the Old Continent, and is also found in both North and South America. Everywhere it is a voyaging bird, though its migrations are mostly from the mountains to the plains, and from the plains to the mountains, and not from one distant country to another. It visits this country at the same time with the Red-wing; and is supposed to come from Sweden. The most numerous tribes arrive in November and December, and as the Alps and Pyrenees are stated to be favourite localities with woodcocks in summer, it is probable that some of our winter visitants arrive from thence. The arrival of these birds is hastened or retarded according to the weather: they appear to wait a favourable gale to waft them towards our shores without much exertion; for, that they are scarcely able to endure their flight is evident from the fatigued condition in which they often reach us. Compelled to alight on the first spot which offers itself, they have been not unfrequently picked up in the open streets of the towns on the coast, being too tired to make their escape. They are in this case usually found to be extremely lean and exhausted, which is the more remarkable, as other birds arriving at the same time, and from an equal distance, show little symptoms of fatigue. It appears that this emaciated condition cannot be attributed solely to exhaustion on account of their long flight; since those which are killed in Norway before the migration has taken place, are already in a poor condition, and infested with vermin. It is therefore probable that their fatigue is the consequence of their debilitated state, and not the cause of it. At first the woodcocks arrive one by one, or two by two, but later in the season they appear in flights, according as the wind serves their purpose. They are often desecrated for the first time in the evening of a misty day, and are found to alight indifferently in woods, hedges, heaths, &c. They are very shy and retired in their habits, and rarely take wing during the day, unless disturbed. At close of day they quit the covers, and wander over the meadows in search of moist places, where they bore for food, retiring to their hiding places again at morning dawn. The eyes of these birds are large and convex, so that they cannot see well except by twilight. A stronger light appears painful to them, and it is probably owing to the weakness of their visual organs, that they have acquired a character for stupidity. In their mode of feeding the eye is not called into use, and they depend on the exquisite sense of feeling in their long bill, aided perhaps by acuteness of smell. As in the duck tribe, the nerves of the bill are extremely numerous, and highly sensible of discrimination by the touch, so that when plunged into the soft earth, not a worm that is within reach can escape.

Although the woodcock, in the great majority of its numbers, is a bird of passage in Britain, yet nests and broods have been discovered both in England and Scotland, so that it has of late been classed among our native birds. Their nests are composed of leaves, or dry plants, heaped on the ground, against the trunk of some tree, or under a thick root. The eggs are dull yellowish white, blotched with reddish brown, and are about four or five in number. They are rather larger than those of the common pigeon, and said to be very good eating. The young birds are voracious feeders; they quit the nest when they are only covered with a soft down, and even begin to fly before they have any other feathers than those of the wings. The number of woodcocks in our islands is generally admitted to be on the decrease, and Mr. Blaine, in noticing the circumstance, complains that these birds are unmercifully pursued, not, as formerly,

by one gunner from every village, two or three from every town, and twenty or thirty from every city, of which number not more than one out of five was a ready shot, but by the far more numerous and practised shooters, who in our day have learned to handle the gun. "The common principles of humanity," says our author, "should prevent a war of utter extermination of a race that comes to seek food and protection from us."

The Common Snipe (*Scolopax gallinago*) is also provincially called *snite*, or *heather-bleater*. Though agreeing very much in external appearance with the woodcock, it differs from it in natural habits, and the place which the woodcock chooses as cover during the day-time, and for the concealment of its nest in the breeding season, is one which would not suit the wants of the snipe. The latter bird prefers the open marshy grounds, and seeks no other concealment than is afforded by tufts of heath and grass. Snipes are still more generally diffused than woodcocks, and there is no portion of the world in which some of them have not been found. They are so numerous in the rice-grounds of Egypt, soon after the crops have been gathered in, that it is not uncommon for a person to shoot a basket-full in a day. The soil is, however, so completely impregnated with water, that the sportsman finds it fatiguing work to traverse the fields, and sinks at every step he takes, sometimes above his knees. These birds are common at the Cape of Good Hope, and in the islands of Ceylon and Japan. They greatly abound in some parts of Ireland, so that forty-three brace have been killed by one gentleman in six hours. The common snipe weighs about four ounces; it is near twelve inches in length, of which the bill occupies three inches. The head is black, with a light rufous stripe down the middle, and others surrounding the eyes; the throat is white; the cheeks, neck, and upper breast mottled with black and rust-coloured patches; the wings, tail-coverts, and back, are barred with the same; the lower breast and belly, white; the legs are in some cases of a dusky lead-colour, in others green.

Autumn is the season for the arrival of this bird in most of the southern and western countries of Europe. It is then met with in meadows, marshes, bogs, and along the banks of streams and rivers. In walking it carries its head erect, without either hopping or fluttering, and gives it a horizontal movement, while the tail moves up and down. On taking flight, it rises so high in the air, as often to be heard after it is lost sight of. The bill of the snipe is no less remarkable than that of the woodcock, being adapted for boring in the soft sludgy ground, where worms abound. It is very interesting to remark the exact adaptation of form in different birds to their peculiar modes of life. In dabbling birds, which sift and turn up the mud of shallow streams with their flat bills, we find the boat-shaped body, the web-foot, and all the necessary adaptations for swimming and diving; but the snipes always have their feet on the ground while they feed, and we find those feet, not indeed so well adapted for walking on elastic vegetation, inasmuch as they are destitute of the long hind toe, which is so essential for that purpose, but yet remarkably fitted for walking on the surface of soft mud, and in those moist and marshy places which form their favourite localities, while they are not in any way adapted for swimming or diving.

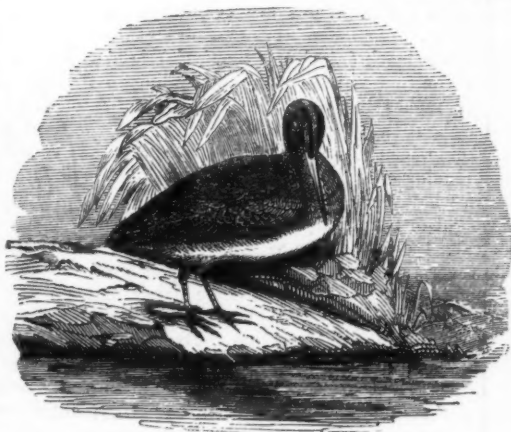
In spring, when the low grounds begin to get dry, snipes make their way to more northerly situations, or to those upland regions where the winter lasts longer, and the surface of the ground continues humid. Some few, however, remain in most parts of the country during summer; and in the north and north-west of Britain and in the bogs of Ireland they are numerous. The nest of the snipe is always in close concealment, among the thickest herbage. It is rudely constructed of vegetable fibres, sometimes lined with withered leaves. The eggs

are four in number, arranged in the form of a cross, with the small ends meeting in the centre: they are of a pale greenish grey, with brown spots. The young leave the nest as soon as they escape from the shell, and the plumage which they rapidly acquire is at first darker than that of the old birds. Their feet are so well developed that they are soon able to go in quest of their own food. The bill is, however, short, and does not attain its full length for two or three months, nor its proper consistency till the following spring. Snipes lie very close in the herbage at all times, and are with difficulty raised to the wing. Their flight has often so many turnings and windings as to make them difficult game. Birds of prey also find the snipe a troublesome and dexterous object of pursuit. In the first place, they have to beat a long time before they can make it take the wing, and then, if the snipe gets the least advantage, it doubles so often and so rapidly that if the hawk is not altogether thrown out, the chase is often a lengthened one.

The snipe usually grows very fat both in Europe and North America, and after the early frosts, its flesh acquires a fine and delicate flavour. It is cooked like the woodcock without extracting the entrails, and is everywhere esteemed as an exquisite game. The fat of the snipe is particularly delicate, and is not apt to cloy or to disagree with those who eat it. Snipes are more numerous than woodcocks in this country, and in the fenny districts are especially abundant. In frosty or snowy weather, these birds resort in numbers to warm springs, and other places where the ground remains unfrozen, these being the only situations in which they are able to procure food. Snipe-shooting is met with in the greatest perfection in Ireland; in Wales, also, both North and South, snipes are plentiful, whether in the mountains or in the more level districts. The mossy lands of Scotland, and the vicinity of the lochs, afford these birds in considerable numbers; while in England, the counties of Cambridge, Lincoln, and Northampton, and the Essex marshes, are their favourite resorts.

Recluse in CUMBRIA'S humid fells,
Or SCOTIA'S dank and rushy dells,
Or where o'er vale or mountain's head
Green ERIN'S heathery swamps are spread;
You'll hear remote the feeble pipe
Shrill sounding of the wakeful SNipe,
And catch, receding from the view
His spots of black and rusty hue;
As, starting from his reedy fen,
He flies abrupt the approach of men,
And, with quick wing and zig-zag flight,
Dazzles the unpractised fowler's sight.

British Months.



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